This listing of claims replaces all prior versions and listings of the claims in the application.

In the Claims

1. (previously presented) A separation by ion implanted oxide (SIMOX) method of forming a buried oxide layer of a semiconductor-on-insulator ("SOI") substrate, comprising:

implanting, at least one time, a base dose including oxygen ions at a first energy level into a buried region disposed below a major surface of a semiconductor substrate to form an oxygen-implanted region;

implanting, at least one time, a second dose including at least one of oxygen ions and nitrogen ions into said oxygen-implanted region at a second energy level while maintaining said substrate at room temperature; and

annealing said substrate to cause said ions implanted by said steps of implanting said base dose and said second dose to be redistributed in said substrate and to react with a material of said substrate to form a buried oxide ("BOX") layer in said oxygen-implanted region, said BOX layer electrically isolating a semiconductor layer of said substrate disposed above said BOX layer from a semiconductor region of said substrate disposed below said BOX layer.

2. (previously presented) The method of Claim 1 wherein said semiconductor layer of said substrate disposed above said BOX layer consists essentially of single crystal silicon and said BOX layer includes silicon dioxide.

3-6. (cancelled)

7. (previously presented) The method of Claim 1, wherein said first energy level and said second energy are in a range between about 40 KeV to about 240 KeV.

8. (previously presented) The method of Claim 1, wherein said second dose has a lower value than said base dose.

9-21. (cancelled)

22. (previously presented) The method as claimed in claim 1, wherein said second energy level is set lower than said first energy level by up to about 10%.

23-26. (cancelled)